REMARKS

Claims 1, 3-8 and 10 are pending in the present application. The Examiner has rejected claims 1, 3-8 and 10.

CLAIM REJECTIONS

Claim Rejections Under 35 USC § 112

Claims 1, 3-8 and 10 have been rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enabling requirement.

Applicant respectfully disagrees with the Examiner regarding the enablement of the methods of placing carriers of different colors. With respect to inkjet printing technology, the specification describes in detail in paragraphs 30, 31, and 32, in conjunction with Figure 2, a method for using inkjet technology to place carriers of different colors on a medium. These paragraphs are reproduced below:

> "[0030] Inkjet technology is based on injecting bubbles of ink through a nozzle as illustrated in FIG. 2. FIG. 2 shows a heater element (300) that forces ink (310) through a pressure chamber (320) out an orifice (330) to jet bubbles of ink 340. The same technology may be implemented to mix and jet quantum beads into small spots. The number of different color quantum dots necessary to reach a storage density of say 1 terabit/square inch (Tb/in.sup.2) is computed as follows:
> [0031] The linewidth of an ensemble of quantum dots is 20-30 nm FWHM. It is possible to pack between 25 and 38 spectral bands between 400 and 1160 nm, which matches the spectral range of standard silicon detectors. By varying the amount of quantum dots of a particular color in one bead, one can achieve various shades (or grades) of coding. Five levels of this coding, also known as gray level coding, can be achieved using the above configuration all with 99.99% identification. This identification level is shown in an article written by M. Han, et. al., entitled

"Quantum-Dot-Tagged Microbeads For Multiplexed Optical Coding Of Biomolecules", published in Nature Biotechnology 19, 631-635 (2001). This means that the number of codes with 38 wavelengths and 6 gray levels is equal to 6.sup.38. This corresponds to Log.sub.2(6.sup.38), which is 98 bits of information that can be packed in one spot size of a commercial disk. Most commercial disk spot size is 0.32 .mu.m, which means that a density of 1215 bits/.mu.m or 0.784 Tb/in.sup.2 can be achieved. This density is unparalleled by any prior art technology, and can exceed the 1 Tb/in.sup.2 range by expanding the spectral range of wavelengths to the infrared and by reducing the quantum dot homogeneity, which will reduce the emission linewidth and thus increase the number of wavelengths.

[0032] The estimated time needed to write 1 Tb/in.sup.2 using current inkjet technology is 42 hours. This is based on 480 number of nozzles in a single print-head, each jetting droplets at the rate of 12,000 drops/second, 6 gray levels and 38 colors, and taking into calculations only half the number of drops per spot ((((6*38)/2)*7.8*10.sup.9)/480*120- 00). This writing time is similar to that of a commercially available CD-RW, and the time can be decreased by increasing the number of nozzles and the jet rate."

The passage describes a suggested number of printheads to use and it describes a suggested number of drops/second. Even though applicant contends that appropriate disclosure is provided even for submicron pit sizes, the description is not limited to such a size. In fact, the description relates to an example as evidenced by the following passage from paragraph 30 *"The number of different color quantum dots necessary to reach a storage density of say 1 terabit/square inch (Tb/in.sup.2) is computed as follows:"* The phrase "say 1 terabit/square inch" shows that the description is an example. This is made clear in the application notes in Paragraph 21 that statet: *"The present invention provides a method for increasing the storage capability of a disk drive regardless of the physical dimensions of the pits."* Therefore the disclosure is not limited to the 0.32 micron pit size suggested by the Examiner. In light of the disclosure, the Examiner's rejection regarding

inkjet printing is moot. The description does fully describe a method of describing how 98 bits of information can be deposited into a disk spot, regardless of the size.

Applicant further refers Examiner to U. S. Patent 7,367,505. This patent describes the placement of quantum dots using inkjet technology at a higher density than is described in the present application (up to 129 bits of information in a DVD spot compared to 98 bits in the specification of the present application). In spite of the Examiner's contention that such inkjet printing is not possible, the '505 patent includes a Figure 10 illustrating "an atomic force microscope image of the surface of a DVD disk 1000 with QDs 1010 deposited within the pits of the disk."

Therefore, the Examiner's rejection is moot.

With respect to Laser induced technology, Applicant respectfully disagrees with the Examiner. Paragraphs 36-38 and 41-44 in conjunction with Figures 3A and 3B describes in detail a method for using laser induced technology for shaping nanoparticle embedded in a host material. In addition, the description references an article on how to shape nano-particles that are embedded. Embedding the materials in a disk would be apparent to one of skill in the art who had the patent application and the referenced article in his possession. The Examiner contends that the cited article is not related to optical recording and suggests that the only teaching is a single paragraph as to how it could be applied to optical recording. Applicant contends that six paragraphs describe the use of shaping techniques in great detail that would be understood by one of ordinary skill in the art.

Claim Rejections Under 35 USC § 103

Claims 1, 3, 4 and 6 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Bawendi et al. (US 6,774,361) in view of Brownstein et al. (US 5,671,202).

Applicant respectfully disagrees. The combination suggested by the Examiner does not teach, describe, or suggest the invention of independent claim 1 because it does not teach each and every element of the claim. For example, the combination does not teach the placing of the carriers using inkjet technology. Therefore claim 1 is allowable over the cited combination.

Claims 1, 3, and 4-8 have been rejected under 35 U.S.C. 103(a) as being unpatentable over McGrew (US 6,692,031) in view of Brownstein. Applicant respectfully disagrees.

The combination suggested by the Examiner does not teach, describe, or suggest each and every element of independent claim 1 of the application. For example, the combination does not include the limitation of nanometer sized particles of different colors. McGrew requires different sized particles to provide different colors. Further, the combination does not place the quantum dots in a data pit on a rotating media.

With respect to the dependent claims, inasmuch as they are dependent on an allowable base claim, they themselves are allowable.

In view of the above amendments and remarks, applicants respectfully request that this application be reexamined and that the claims, as amended, be allowed.

Applicants also file concurrently herewith a PETITION FOR EXTENSION OF TIME and tender the government fees for the extension.

Please charge any deficiency in fees or credit any overpayments to Deposit Account No. 07-1896.

Respectfully submitted,

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